The Economics of Air Pollution

Our Agenda

A. Patrick Behrer
abehrer@worldbank.org

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The poorest people in the world are the most exposed to air pollution.

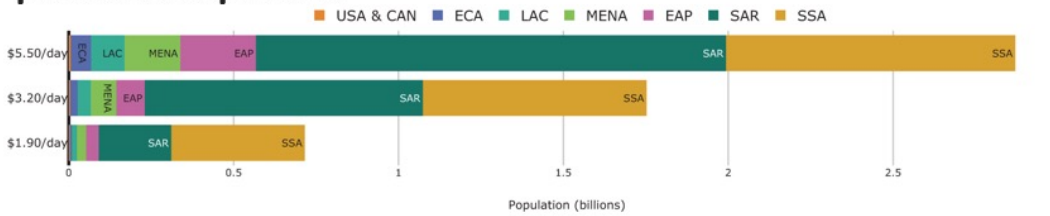
It kills more people per year than **tuberculosis, malaria, and AIDs combined.**

From 2030 and 2050, between **18x and 36x as many people will die prematurely due to air pollution than climate change** according to the UN.

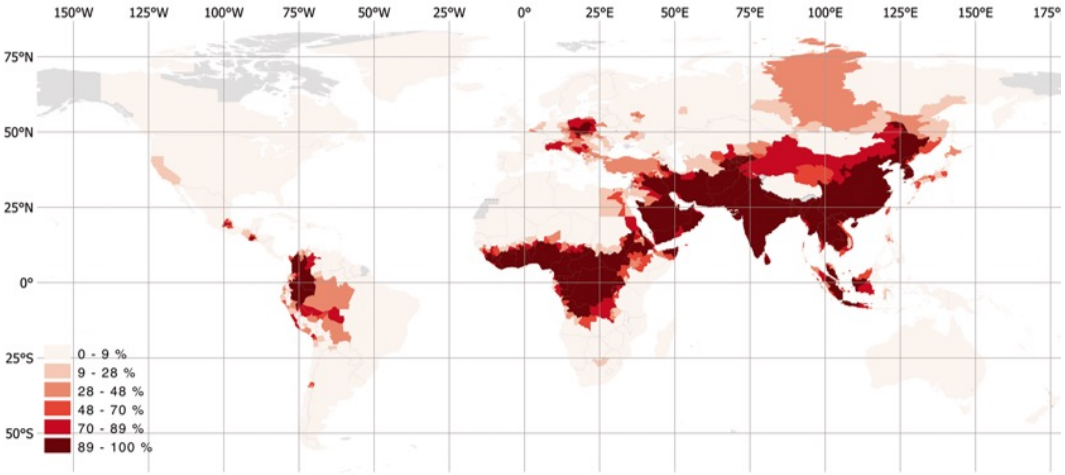
Most of these deaths will occur in low- and middle-income countries.

Roughly **80% of those living in poverty** are exposed to unsafe annual average levels of pollution.

Number of people living in poverty and facing unsafe air pollution exposure.



Exposure to unsafe average annual PM2.5 concentrations (>15 ug/m^3) as a share of the population



Source: Rentschler Leonova (2023)

Health is only one part of the damage function

It is increasingly clear that air pollution **has adverse consequences that go beyond the morbidity and mortality** impacts.

These include impacts on:

- Student learning
- Worker productivity
- Worker safety
- Overall economic activity

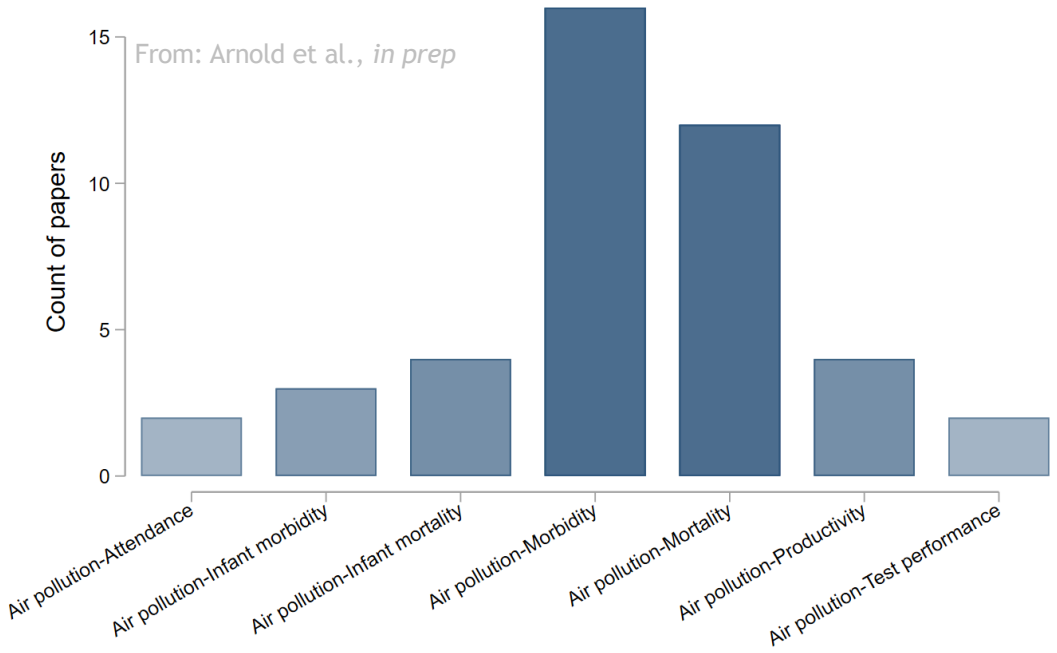
That implies:

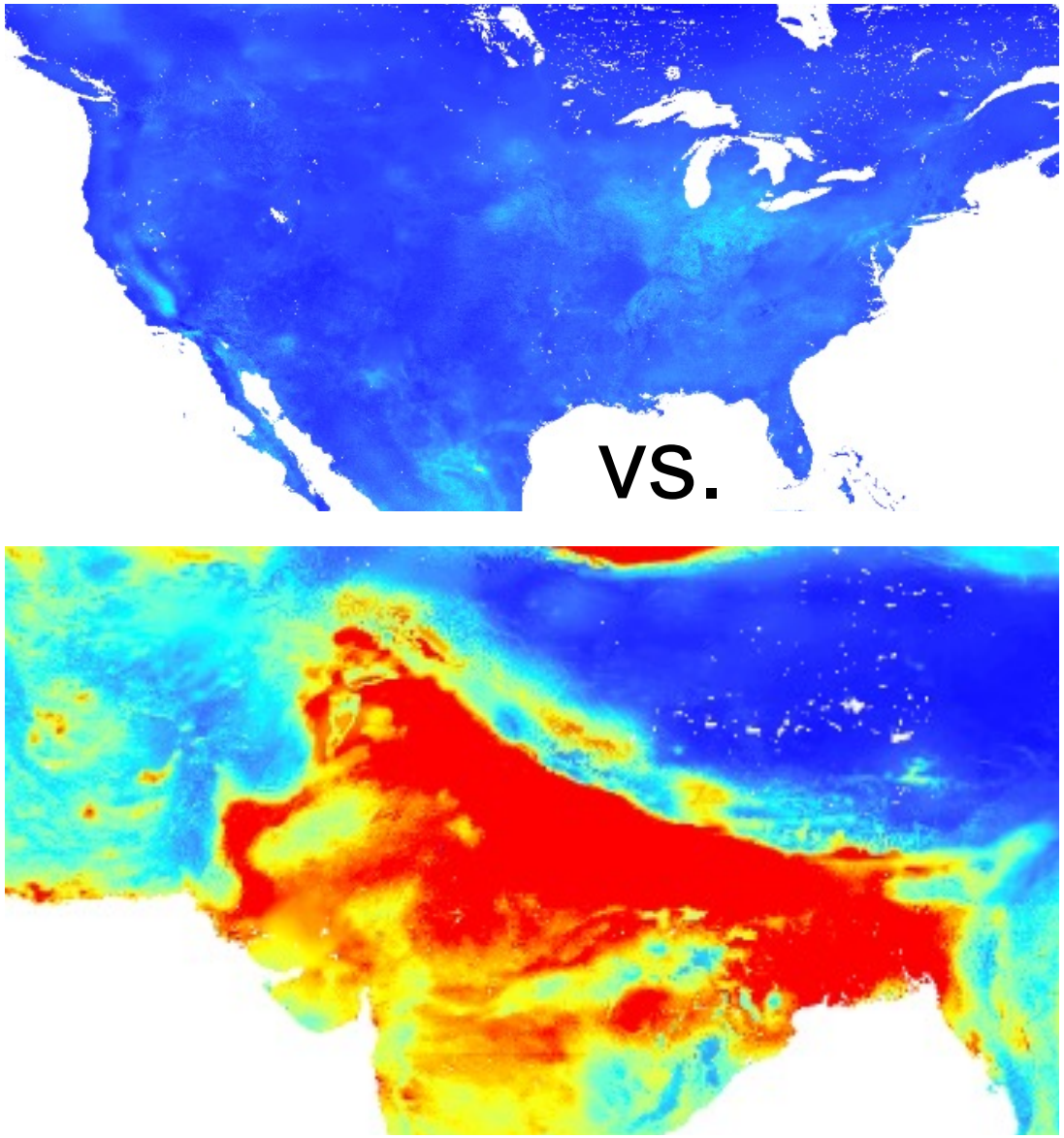
1. Pollution may be an important determinant of economic growth
2. The costs of air pollution may be much larger than a health-based approach would suggest.

There remain significant gaps in our knowledge

Knowledge Gaps

Gap #1: There are relatively few well-done studies on these questions





Knowledge Gaps

Gap #1: There are relatively few well-done studies on these questions

Gap #2: Most studies are from wealthy or upper-middle income countries.

Obviously reducing ambient exposure is important but it is a long-term goal.

What are interventions that are effective in the short term?

Knowledge Gaps

Gap #1: There are relatively few well-done studies on these questions

Gap #2: Most studies are from wealthy or upper-middle income countries.

Gap #3: Best strategies for mitigating these consequences remain unclear.

Our agenda

Key research pillars

1. Facilitating and capitalizing on international cooperation
2. **Understanding and expanding the role of information provision in motivating policy and individual action**
3. Expanding the scope of emissions markets and emissions pricing while promoting effective designs
4. Building capacity for accurate cost and benefit estimation of emissions reduction policies

Example project

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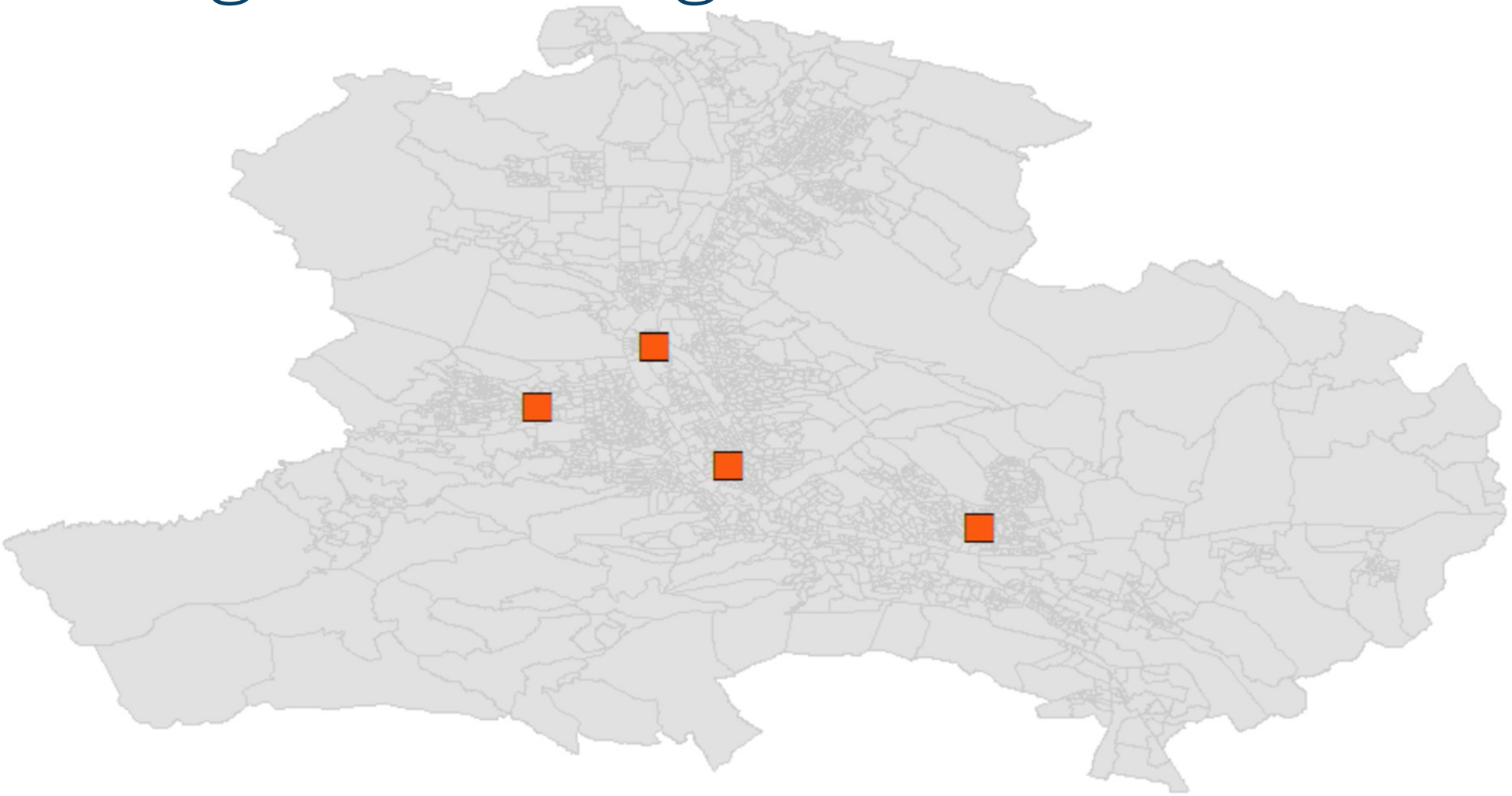
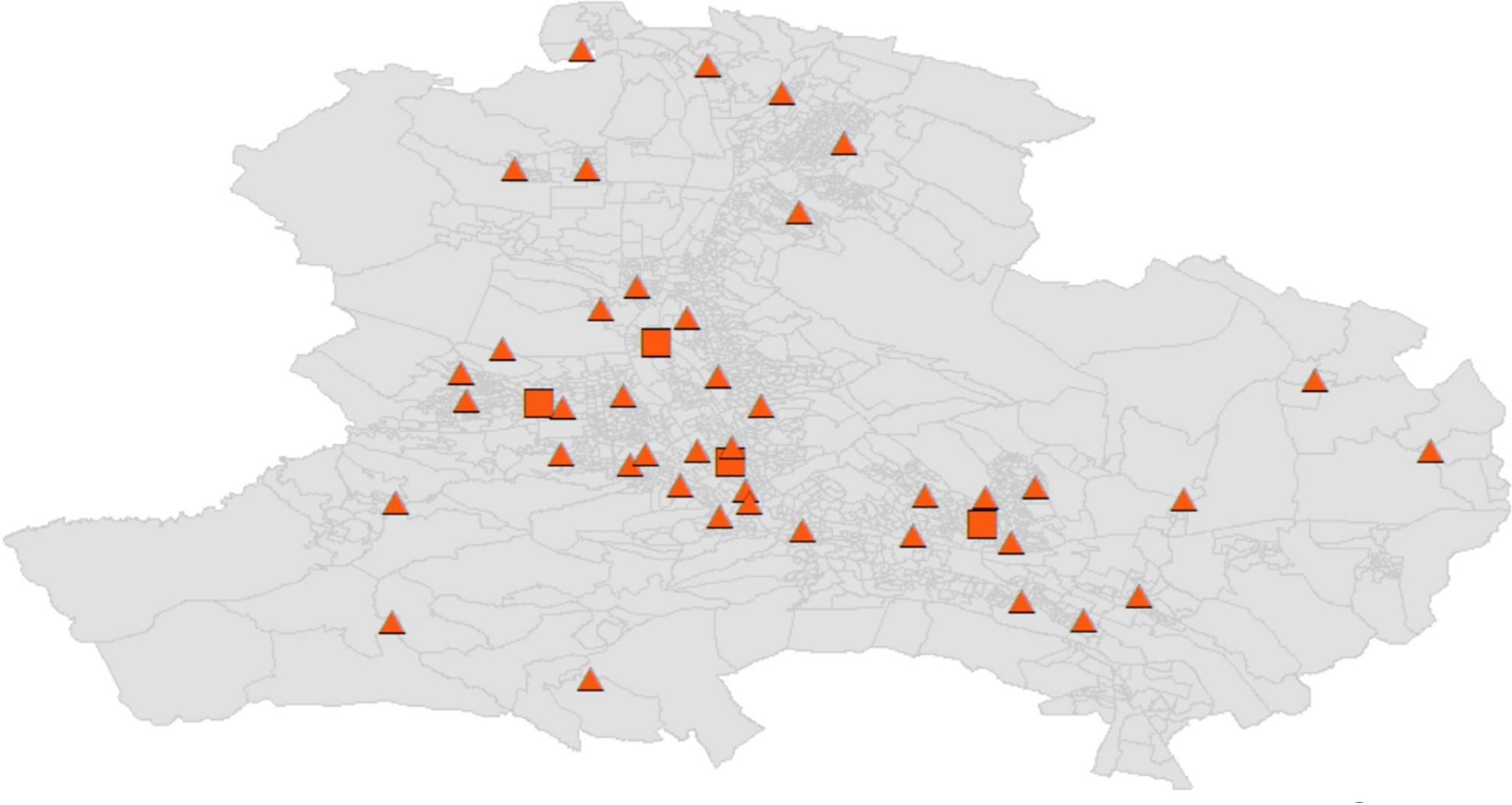
Program for Poverty Reduction in Georgia (P178693)

Existing monitoring network



Our outdoor monitor locations

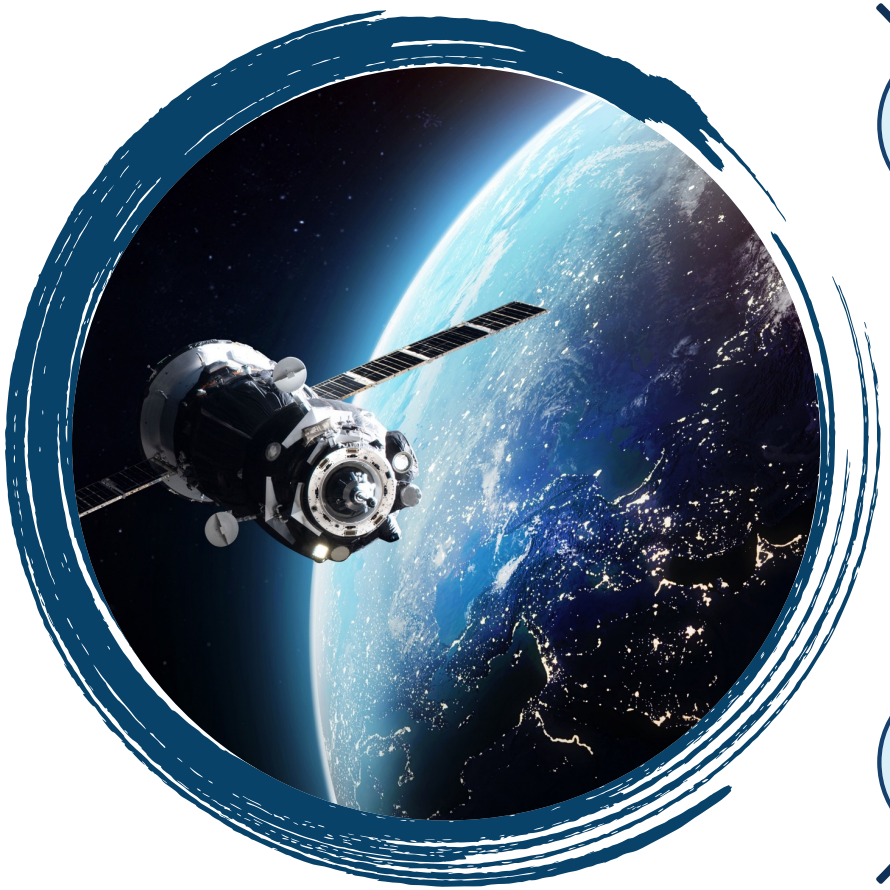


Impact of providing outdoor information

	Knowledge of pollution	Actions to avoid pollution	Health symptoms
	Leaflet Treatment		
Treatment effect	-0.3493	-0.0262	-0.0571
	(0.3254)	(0.1350)	(0.1518)
N	458	458	375
	Outdoor Treatment		
Treatment effect	0.4912	0.3107**	0.2468
	(0.3258)	(0.1427)	(0.1575)
N	457	457	368
	Outdoor and Indoor Treatment		
Treatment effect	0.7597**	0.3079*	-0.3692**
	(0.3057)	(0.1566)	(0.1752)
N	375	375	309
Pre-period outcome means:			
Leaflet treatment:	10.90	1.35	1.49
Outdoor treatment:	10.75	1.23	1.30
Outdoor & Indoor treatment:	11.23	1.49	1.77

NOTES: The outcome in all columns is the difference in the count of self-reported knowledge, adaptive behaviors, or health symptoms of pollution exposure from each household in the survey. The omitted group is the control group. The survey asked about adaptive actions and health symptoms during the 30 days prior to each survey round. The actions we ask about are: avoiding busy traffic areas, avoiding high levels of outdoor activity on high pollution days, using a ventilation fan while cooking, opening windows to vent the house. The symptoms we ask about are: eye irritation, sore throat, headache, cough, wheezing, sinus pain, or shortness of breath. Heteroskedasticity robust standard errors clustered by census block - the sampling unit- are in parentheses (* p<.10 ** p<.05 *** p<.01). We report results controlling for household wealth and housing age in Table A2.

What I wish I could do with satellite data



- Daily, high resolution PM measures
- Daily forecasts of PM levels
- Event detection (e.g. smoke plumes)
- Facility level emissions monitoring

Thank you!

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